1. A process for manufacturing a disposable multi-chamber chip, each chamber having low thermal capacity and good thermal isolation from its neighbors, comprising;

providing a mold whose surface includes a plurality of shallow depressions having a depth;

placing at least one sheet of a first plastic material, having a first softening temperature, on said mold surface;

on said first plastic material, placing a sheet of a second plastic material that has a second softening temperature that is less than said first softening temperature;

heating all materials to said second softening temperature;

applying uniform pressure between said plastic sheets and said mold whereby said second plastic material flows, thereby forcing said sheet of first plastic material to conform to said mold surface;

then cooling until said second plastic material has fully hardened; and

separating said plastic materials one from another and then removing the sheet of first plastic material from the mold, thereby forming said disposable multi-chamber chip.

2. The process described in claim 1 wherein said mold is silicon or Ni.

3. The process described in claim 1 wherein said first plastic material is selected from the group consisting of PP, PC, and PET.

4. The process described in claim 1 wherein said second plastic material is selected from the group consisting of PC and PMMA.

5. The process described in claim 1 wherein said uniform applied pressure is at least 5KN.

6. The process described in claim 1 wherein said second softening temperature is between about 50 and 100 °C less than said first softening temperature .

7. A process for multi-chamber thermal multiplexing wherein each chamber has low thermal capacity and is thermally isolated from its neighbors, comprising;

providing a mold whose surface includes a plurality of shallow depressions having a depth;

placing at least one sheet of a first plastic material, having a first softening temperature, on said mold;

on said first plastic material, placing a sheet of a second plastic material that has a second softening temperature that is less than said first softening temperature;

heating all materials to said second softening temperature;

applying uniform pressure between said plastic sheets and said mold whereby said second plastic material flows, thereby forcing said sheet of first plastic material to conform to said mold surface;

then cooling until said second plastic material has fully hardened;

separating said plastic materials one from another and then removing the sheet of first plastic material from the mold, thereby forming a plurality of shallow chambers in a disposable plastic chip having a top surface;

placing said plastic chip on an array of heating blocks whose size and spacing matches that of said multi-chamber array;

filling at least two of said chambers with liquid samples in the form of layers that are less than 500 microns thick;

bonding a cover slip to said top surface so that each liquid sample is completely sealed within its own chamber; and

then using said heating blocks to heat said liquid samples.

8. The process described in claim 7 wherein said mold is silicon or Ni.

9. The process described in claim 7 wherein said first plastic material is selected from the group consisting of PP, PC, or PET.

10. The process described in claim 7 wherein said second plastic material is selected from the group consisting of PC and PMMA.

11. The process described in claim 7 wherein said uniform applied pressure is at least 5 KN.

12. The process described in claim 7 wherein said second softening temperature is between about 50 and 100 °C less than said first softening temperature.

13. The process described in claim 7 wherein the step of using said heating blocks to heat said liquid samples further comprises simultaneously heating different liquid samples to different temperatures.

14. A process for multi-chamber thermal multiplexing wherein each chamber has low thermal capacity and is thermally isolated from its neighbors, comprising;

providing a mold whose surface includes a plurality of shallow depressions having a depth;

placing at least one sheet of a first plastic material, having a first softening temperature, on said mold;

on said first plastic material, placing a sheet of a second plastic material that has a second softening temperature that is less than said first softening temperature;

heating all materials to said second softening temperature;

applying uniform pressure between said plastic sheets and said mold whereby said second plastic material flows, thereby forcing said sheet of first plastic material to conform to said mold surface;

then cooling until said second plastic material has fully hardened;

separating said plastic materials one from another and then removing the sheet of first plastic material from the mold, thereby forming a plurality of shallow chambers in a disposable plastic chip having a top surface;

inserting the disposable plastic chip into cavities singly located within an array of heat sinks whose size and spacing matches that of said multi-chamber array;

filling at least two of said chambers with liquid samples in the form of layers that are less than 500 microns thick;

placing an array of heating blocks, whose size and spacing matches that of said multi-chamber array, in contact with said plastic chip top surface to so that each liquid sample is completely isolated within its own chamber;

applying and then maintaining uniform pressure between said heat sink array and said heating block array, thereby ensuring good heat transfer between them and said liquid samples; and

then using said heating blocks to heat said liquid samples.

15. The process described in claim 14 wherein said mold is silicon or Ni.

16. The process described in claim 14 wherein said first plastic material is selected from the group consisting of PP. PC, and PET.

17. The process described in claim 14 wherein said second plastic material is selected from the group consisting of PC and PMMA.

18. The process described in claim 14 wherein said uniform applied pressure is at least 5 KN.

19. The process described in claim 14 wherein said second softening temperature is between about 50 and 100 °C less than said first softening temperature.

20. The process described in claim 14 wherein the step of using said heating blocks to heat said liquid samples further comprises simultaneously heating different liquid samples to different temperatures.

21. A disposable multi-chamber chip wherein each chamber has low thermal capacity and is thermally isolated from its neighbors, comprising;

a continuous plastic sheet having a top surface and a thickness that is less than about 200 microns;

an array of depressions in said plastic sheet that extend downwards from said top surface a distance of no more than about 500 microns; and

said depressions being separated one from another by at least 1 mm.

22. The disposable multi-chamber chip described in claim 21 further comprising an attached outer frame that serves to increase the rigidity of said chip.

23. The disposable multi-chamber chip described in claim 21 further comprising micro-channels that extend outwards, parallel to said top surface, from said depressions, serving thereby to prevent bubble formation.

24. The disposable multi-chamber chip described in claim 21 wherein said plastic sheet is selected from the group consisting of PP, PC. And PET.

25. The disposable multi-chamber chip described in claim 21 wherein, relative to all neighboring heat sources, each chamber has a thermal conductance that is less than about 50-70 WK^{-1}.

26. The disposable multi-chamber chip described in claim 21 wherein a temperature uniformity of less than about 0.5 °C can be maintained within a given liquid placed in one of said depressions.

27. The disposable multi-chamber chip described in claim 21 wherein a given liquid, placed in one of said depressions, can have its mean temperature controlled to a precision level of about 0.1 °C .

28. A multi-chamber thermal multiplexer, comprising;

a disposable plastic chip in the form of a continuous plastic sheet having a top surface and a thickness that is less than about 200 microns;

an array of depressions in said plastic sheet that extend downwards from said top surface a distance of no more than about 500 microns;

said depressions being separated one from another by at least 1 mms;

said plastic chip being in contact with an array of heating blocks whose size and spacing matches that of said multi-chamber array;

at least two of said chambers being filled with liquid samples; and

a cover slip being bonded to said top surface so that each liquid sample is completely sealed within its own chamber.

29. The multi-chamber thermal multiplexer described in claim 28 further comprising an outer frame attached to said disposable chip that serves to increase the rigidity of said chip.

30. The multi-chamber thermal multiplexer described in claim 28 further comprising micro-channels that extend outwards, parallel to said top surface, from said depressions, serving thereby to prevent bubble formation.

31. The multi-chamber thermal multiplexer described in claim 28 wherein said disposable plastic chip is selected from the group consisting of PP, PC, and PET

32. The multi-chamber thermal multiplexer described in claim 28 wherein, relative to all neighboring heat sources, each chamber has a thermal conductance that is less than about 50-70 WK^{-1}.

33. A multi-chamber thermal multiplexer, comprising;

a disposable plastic chip in the form of a continuous plastic sheet having a top surface and a thickness that is less than about 200 microns;

an array of depressions in said plastic sheet that extend downwards from said top surface a distance of no more than about 500 microns;

said depressions being separated one from another by at least 1 mm;

the disposable plastic chip having been inserted into cavities, each such cavity being located within an array of heat sinks whose size and spacing matches that of said multi-chamber array;

at least two of said chambers having been filled with liquid samples; and

said plastic chip top surface being bonded to an array of heating blocks whose size and spacing matches that of said multi-chamber array so that each liquid sample has been completely sealed within its own chamber.

34. The multi-chamber thermal multiplexer described in claim 33 further comprising an outer frame attached to said disposable chip that serves to increase the rigidity of said chip.

35. The multi-chamber thermal multiplexer described in claim 33 further comprising micro-channels that extend outwards, parallel to said top surface, from said depressions, serving thereby to prevent bubble formation.

36. The multi-chamber thermal multiplexer described in claim 33 wherein said disposable plastic chip is selected from the group consisting of PP, PC, and PET.

37. The multi-chamber thermal multiplexer described in claim 33 wherein, relative to all neighboring heat sources, each chamber has a thermal conductance that is less than about 50-70 WK^{-1}.